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(58) Field of search F2Q
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(54) **Improvements in or relating to a sprocket assembly**

(57) A sprocket assembly has a tooth-ring member 11 formed of wear-resistant material, such as powdered-iron and an insert member 12 made of lightweight material, such as die-cast aluminium material. These members are fitted together axially in concentric relationship. A plurality of tongues 17 and matching grooves 26 extend axially of the members for interlocking the members against relative rotation about their common central axis. The members are locked against relative axial displacement, after the members have been fitted together, by deformation of one member.

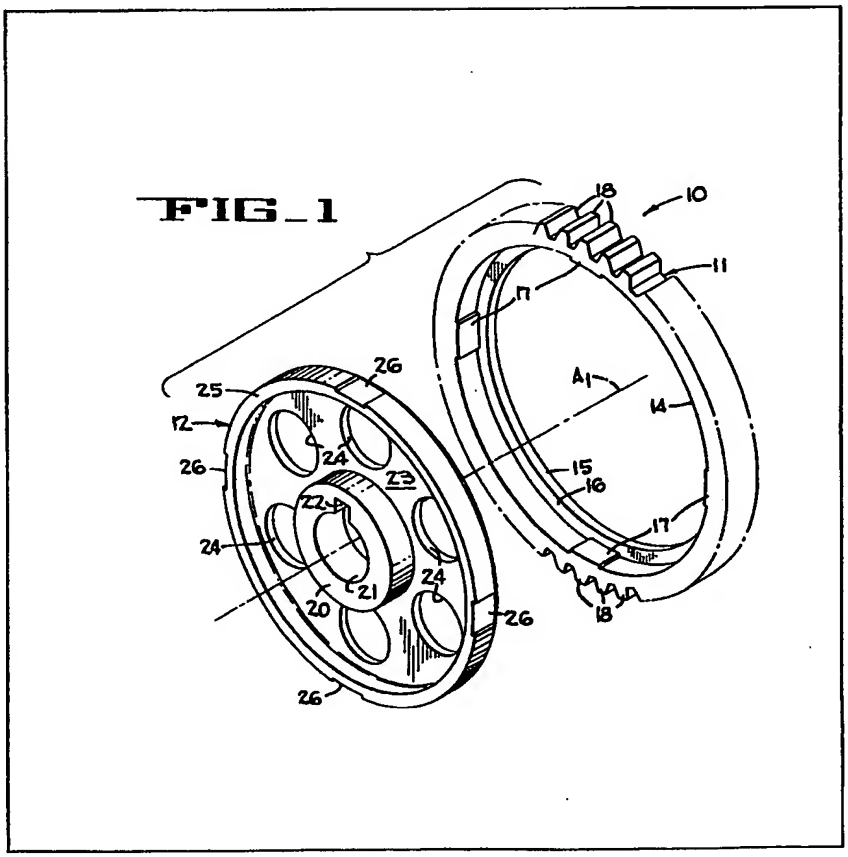

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FIG_1

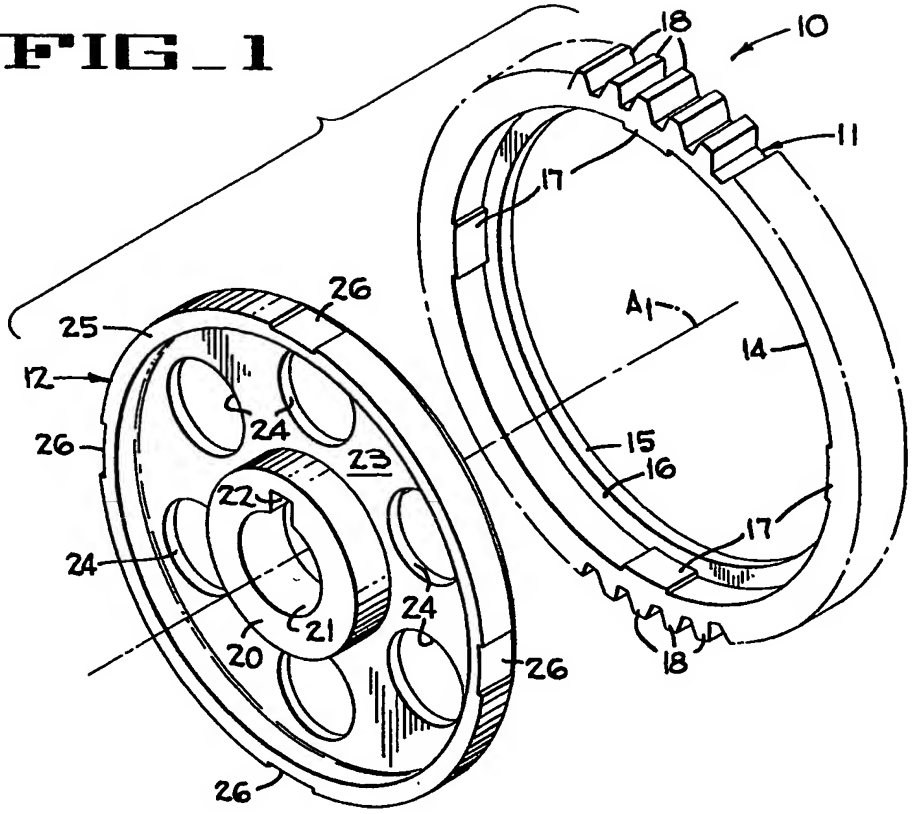


FIG_3

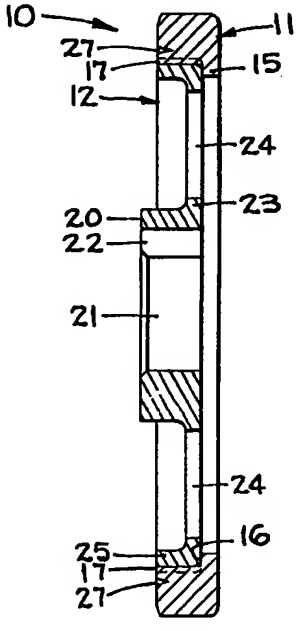


FIG_2

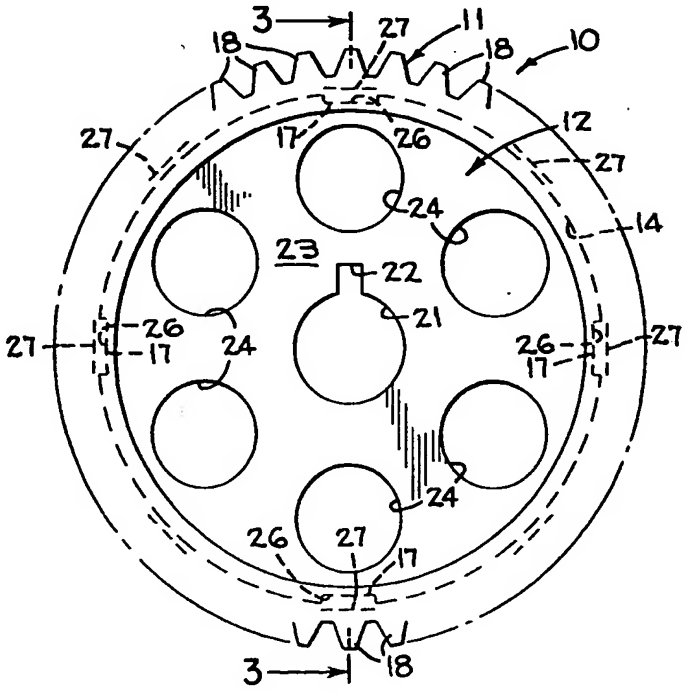


FIG_4

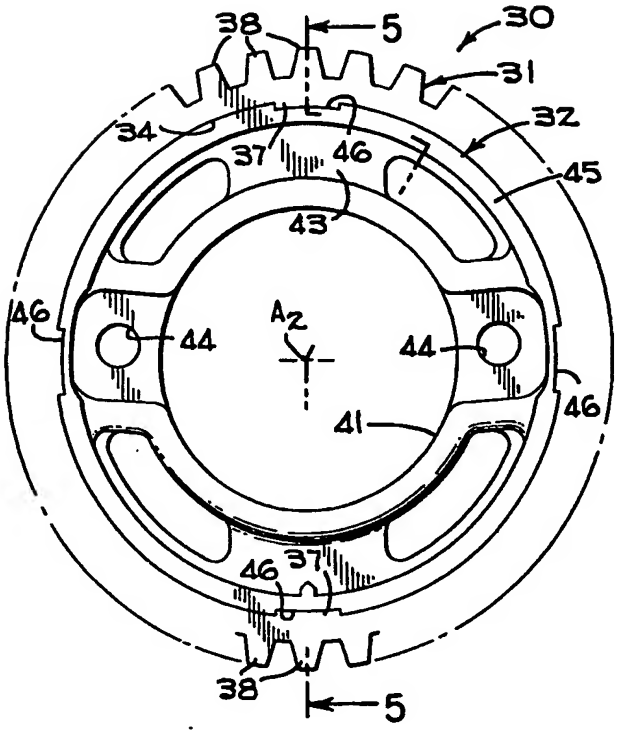


FIG_5

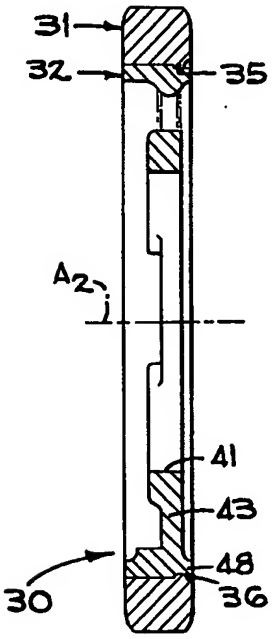


FIG_6

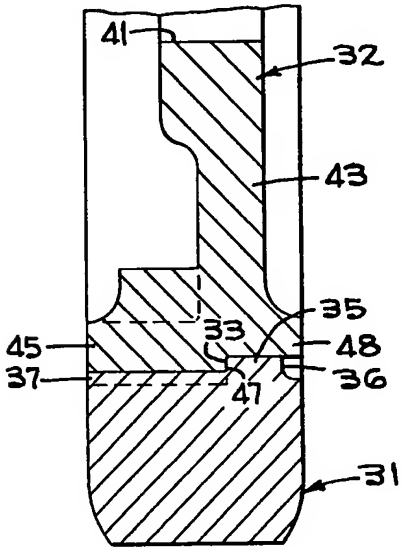
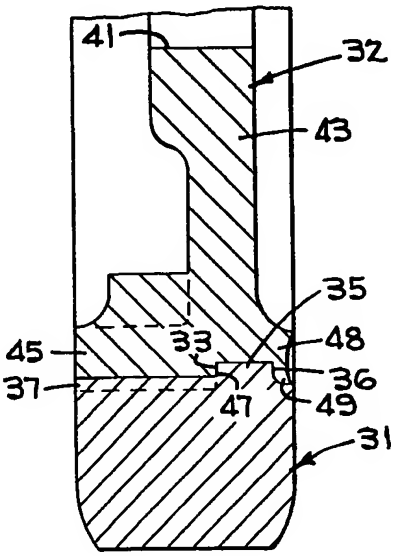


FIG_7



SPECIFICATION

Improvements in or relating to sprocket assemblies

The present invention relates to a sprocket assembly.

According to the invention, there is provided a sprocket assembly comprising a tooth-ring member having a bore, said tooth-ring member being made of wear-resistant metal, an insert member arranged to fit axially within the bore of the tooth-ring member, said insert member being made of a lightweight metal, means for interlocking said members against relative rotation about the axis of the assembly, and means for interlocking said members against relative axial displcement.

Further according to the invention, there is provided a sprocket assembly comprising a toothed ring member of wear-resistant metal fitted around a central lightweight hub so as to be fast for rotation with the hug, and means for preventing relative axial movement between the ring member and the hub.

Embodiments of the invention, will now be described by way of example only, with reference to the accompanying diagrammatic drawings, in which:

Figure 1 is an exploded perspective view of a sprocket assembly in accordance with the invention;

Figure 2 is a side elevation of the sprocket assembly shown in Figure 1, when assembled;

Figure 3 is a section taken on a line 3-3 of Figure 2;

Figure 4 is a side elevation of another embodiment of a sprocket assembly in accordance with the invention;

Figure 5 is a section taken on line 5-5 of Figure 4;

Figure 6 is an enlarged fragmentary section before deformation of a joint between a tooth-ring member and an insert member of the sprocket assembly shown in Figure 4;and

Figure 7 is a fragmentary section after deformation of the joint shown in Figure 6.

Looking now at Figures 1 - 3, a sprocket assembly 10 includes a tooth-ring member 11 and an insert member or hub 12. The tooth-ring member is made of wear resistant metal such as powdered iron M.P.I.F. F0008P. The insert member is made of a lightweight metal, such as die-cast aluminium alloy, SAE308. The members are shown separated in Figure 1, and in Figures 2 and 3, the members are fitted together to form the sprocket assembly.

The tooth-ring member 11 has a bore 14 with a central axis A_1. At one side of the tooth-ring member, a flange 15 projects radially inward toward the central axis of the bore. This flange has a radial face 16 that is located intermediately of the bore. Four tongues 17 (shown in Figure 1) extend axially of the bore from the radial face of the flange. These tongues project radially inward from adjacent internal surfaces of the tooth-ring member, other than the flange. Sprocket teeth 18, of a desired shape and size, are provided about the outer periphery of the tooth-ring member.

The insert member 12 has a hub 20 with a central bore 21 for receiving s shaft, not shown. A key slot 22 is provided within the hub, at a location adjacent the bore, so that the hub can b k y d to the shaft. Extending radially fr m on nd of th hub in a plate 23, having perforati ns 24 ther in to reduce the weight of the plate. At the periphery of the plane is a rim 25 that extends axially parallel to the hub. Within the rim are four axially extending grooves 26 that match with the tongues 17 on the tooth-ring member 11. The insert member can be slipped axially into the tooth-ring member bore 14, until the insert member abuts the radial face 16.

The tongues 17 and grooves 26 interlock the members 11 and 12 against relative rotation about the central axis A_1. The radial flange 15 limits relative displacement of the members along the central axis in one direction. The side of the tooth-ring member, opposite from the flange, is staked at eight equally spaced places thereabout, to limit relative displacement of the members in the opposite direction along the central axis. Such staking is accomplished by driving a blade into the radial side face of the tooth-ring member to form indentation 27 therein. This deforms the metal within the tooth-ring member, between the indentation and the bore, to bear radially against the insert member 12. Thus, frictional contact between the members limits relative displacement of the members along the central axis in the opposite direction from the radial flange 15.

Looking now at Figures 4-7, a second embodiment of the invention is represented by a sprocket assembly 30 that has a tooth-ring member 31 and an insert member 32. The tooth-ring member is made of wear-resistant, powdered metal M.P.I.F. F0008P. The insert member is made of lightweight, die-cast aluminum alloy, SAE308.

The tooth-ring member 31 has a bore 34 with a central axis A_2. At a location axially intermediate of the bore, a flange 35 projects radially inward toward the central axis. This flange has radial faces 33 and 36. Four tongues 37 extend axially of the bore from the radial face 33. These tongues project radially inward from adjacent internal surfaces of the tooth-ring member, other than the flange. Sprocket teeth 38 are provided about the outer periphery of the tooth-ring member.

The insert member 32 has a central opening 41. A web 43 extends radially from the central opening. This web is provided with axially extending bolt holes 44 that enable the web to be bolted to a support, not shown, such as the face of a drum. At the periphery of the web is an axially extending rim 45. This rim has four axially extending grooves 46 that match with the tonges 37 on the tooth-ring member 31. The periphery of the rim is stepped in diameter at an axially intermediate location to provide a radial face 47 that abuts the radial face 33 when the members are fitted together. A portion 48 of the rim extends axially beyond the flange radial fac 36, as shown in Figures 5 and 6. This axially extending portion of the rim is then deformed by placing a ring upon the radial nd fre f this portion and pressing axially inward. The axially extending portion deforms radially outward forming a flange 49 that abuts the radial face 36.

Thus, it will be seen that the sprocket assemblies 10 and 30 utilize wear-resistant material in the

tooth-ring members 11 and 31 that are subject to wear. The insert members 12 and 32 are made of lightweight material to reduce the weight of the sprocket assemblies. Thus, materials are combined as needed to provide lightweight sprocket assemblies with improved wear-life.

The sprocket assemblies 10 and 30 have tooth-ring members 11 and 31 with bores 14 and 34 that have central axes A_1 and A_2. Axially extending tongues 17 and 37 fit within matching grooves 26 and 46 to interlock the tooth-ring and insert members against relative rotation about the central axis. The tooth-ring and insert members are interlocked against relative displacement along the central axes by radial flanges 15, 35 and 49 and by deformation resulting from the indentations 27.

Each sprocket assembly described utilizes wear resistant material at locations that are subject to wear. A lightweight core insert is provided for the bulk of the sprocket assembly. Thus, materials are combined as needed, to provide a lightweight sprocket assembly with an improved wear life. The tooth-ring member and the insert member are readily formed, easily assembled, locked against relative rotation about a central axis, and locked against relative displacement along the central axis.

The sprocket assembly described can be used for example in automobile engines having high operating temperates where lightweight nylon sprockets would be liable to rapid wear.

CLAIMS

1. A sprocket assembly comprising a tooth-ring member having a bore, said tooth-ring member being made of wear-resistant metal, an insert member arranged to fit axially within the bore of the tooth-ring member, said insert member being made of a lightweight metal, means for interlocking said members against relative rotation about the axis of the assembly, and means for infterlocking said members against relative axial displacement.

2. A sprocket assembly according to claim 1, wherein the tooth-ring member is made of powdered metal.

3. A sprocket assembly according to claim 1 or claim 2, wherein the insert member is mace of diecast aluminium alloy.

4. A sprocket assembly according to any one of claims 1 to 3, wherein the means for interlocking the members against relative rotation about the axis comprises a plurality of axially extending tongues on one of said members and corresponding grooves in the other of said members to receive the tongues.

5. A sprocket assembly according to any one of claims 1 to 4, wherein the means for interlocking said members against relative axial displacement comprises portions of the two members which abut axially when the members have been assembled together and a deformed portion of at least one of said members, deformation being effected after assembly.

6. A sprocket assembly according to claim 5, wherein said tooth-ring member is deformed on one axial side by driving a blade axially therein at a plurality of locations spaced about the bore.

7. A sprocket assembly according to claim 5 or claim 6, wherein at least one of said members has a radially-directed flange arranged to abut axially against the other member.

8. A sprocket assembly according to claim 5, wherein the insert member is deformed axially after assembly to form a radially-outward extending flange.

9. A sprocket assembly according to claim 8, wherein at least one of said members includes a radially-directed flange arranged to abut axially against the other member on assembly of the two members, and located on the opposite axial side of the assembly to the said flange which is formed by deformation after assembly.

10. A sprocket assembly according to claim 4 or any claim dependent on claim 4, wherein the tongues are on the tooth-ring member and the grooves are in the insert member.

11. A sprocket assembly comprising a toothed ring member of wear-resistant metal fitted around a central lightweight hub so as to be fast for rotation with the hub, and means for preventing relative axial movement between the ring member and the hub.

12. A sprocket assembly substantially as hereinbefore described with reference to Figures 1 to 3, or 4 to 7 of the accompanying drawings.

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